Analysis:

Findings:

- In most cases, multiple threads took much less time to compute than multiple processes.
- For both multiple process and multiple threads, as the number of files increased, the average time of execution per files decreased. As the number of directories increased, the average time of execution per files increased.

Is the comparison between run times a fair one? Why or why not?

- No, the comparison between run times not a fair one because multiple threads have to deal with bigger csv file which is a combination of all the unsorted csv inputs to sort on whereas multiple processes only have to work with each individual csv files, which would obviously take much less time than what the multiple threads program do.
- As a result of this, the multiple threads cannot take full advantage of its usage and so if they both were programmed to do the same thing, there would have been much bigger difference between the run times of multiple threads and multiple processes.

What are some reasons for the discrepancies of the times or for lack of discrepancies?

- Some reasons for the discrepancies of times may be due to the speed of hard drives, the OS scheduler, and other users.

If there are differences, is it possible to make the slower one faster? How? If there were no differences, is it possible to make one faster than the other? How?

- Yes, there are differences in timing and multiple processes are generally slower than multiple threads.
- It is difficult to make multiple processes faster than multiple threads due to all the forkings and excessive resources that are required for multiple processes.
- At least for this case with sorting, it is very unlikely that multiple processes can run faster than multiple threads.

Is mergesort the right option for a multithreaded sorting program? Why or why not?

- Yes, mergesort is the right option for this multithreaded sorting program since each files are sorted from individual threads then combined into one big file and sorted again using the main thread which is exactly how mergesort works. Therefore, mergesort is the best option for this sorting program.